

p. m., and the means were obtained by dividing the sum of the readings by twice the number of days in the month.

In 1869-1882, inclusive, both instruments were read at 9 a. m. and 2 p. m., and the mean obtained as just explained.

In 1892-93-94 readings were made at 10 a. m. and 3 p. m., and means obtained in the same manner as from the 9 a. m. and 2 p. m. readings.

In 1895-96-97 and to August, 1898, the readings were made at 9 a. m. and 3 p. m., and the means obtained as above explained. Subsequent readings were those of the United States Weather Bureau, and the time is known.

In regard to the hours suggested in the text, viz, 9 a. m. and 4 p. m., I will say that at the time I wrote I thought that those hours would give a good average temperature, but it now appears that 4 p. m. was a little too late; perhaps it would be more nearly correct to say 9 a. m. and 3 p. m.

### METEOROLOGY IN ECUADOR.

A letter from the Director of the Meteorological Observatory of the National College, San Vincente of Guayas, located at Guayaquil, Ecuador, informs Professor Moore that on November 27, 1899, the college observatory and printing office were totally destroyed by fire. Therefore, for the present the publication of the monthly bulletin of the observatory must be interrupted. The new buildings are already in process of construction and will be occupied even before they are finished, so that both the observations and the bulletin will be resumed as soon as possible.

The Chief of the Weather Bureau expresses to the director his sympathy in this great loss and his admiration of the energy with which the damage is being repaired.

### LECTURES AT FARMERS' INSTITUTES.

On February 21, Mr. Frank P. Chaffee, Section Director at Montgomery, Ala., by authority of the Chief of the Weather Bureau, attended the Negro Farmers' Conference held under the auspices of the Institute at Tuskegee, Ala. According to Mr. Chaffee's report it is estimated that fully 3,000 people attended the meeting, of whom about 800 were farmers, and many were owners of large tracts of land. They were mostly from Alabama, but twenty other States were represented, and Mr. Chaffee adds that "the meeting was one of the most enthusiastic and beneficial of its kind I have ever attended." Prof. Booker T. Washington presided over the Conference, and many topics of interest to the farmer were discussed. Professor Washington, after alluding to the good work the Weather Bureau is doing for the agricultural interests, and expressing his appreciation of the courtesy of the Chief of the Bureau in allowing one of its officials to attend the meeting, introduced Mr. Chaffee, who delivered an address, in the course of which he said:

It is Professor Moore's special desire that the Weather Bureau shall be made of the greatest practical benefit to the farmers, and he has, therefore, delegated me to come here to explain some of the ways in which this can be done. If there is any one class on which the country depends for its prosperity more than another, it is the farmer and planter—not the man of antiquated ideas and methods, who plants corn year after year on the same ground, merely because his father and his father's father did so, but the up-to-date, progressive farmer who diversifies his crops, and exercises the same degree of intelligence in his business as does the merchant, the mechanic, or any other worker. It is only in recent years that this branch of industry has commanded so much attention from the thinkers of the country, and only within the last decade that it has been the focus of so much intelligent thought.

The work of the Agricultural Department is so broad as to embrace every line of scientific research which can be made of practical benefit to the farmers. Some of its specialists analyze the soil, and determine what plant life is best adapted to it. Others investigate the storage of ground-water, the most economical methods of irrigation, the methods for preventing the spread of cattle diseases, and everything pertaining to the improvement of live stock. The Department also has its agents searching everywhere for new varieties of plants and seeds which can be domesticated with advantage and profit, while its thorough system

of experiment stations brings before the farmer object lessons in the practical use of the intelligence thus accumulated.

You are all aware of the importance of knowing at some critical time in your work just what the weather will be to-morrow. To tell you this is the specific purpose of the Weather Bureau, and when it has spent money—*your money*—to place this intelligence before you, and you do not use it, then the loss and the blame are yours. If it be true, as claimed, that the farmers of the North and West are more successful than the farmers of the South, it is certainly not because their soil is any more fertile or their climate any more favorable. It is true, however, that they keep in intelligent touch with every source of information and are specially attentive to the forecasts and warnings of the Weather Bureau. A farming community in the Ohio Valley without the daily weather forecasts is almost unknown.

While it is true that occasionally the forecasts are not verified, still they are certainly the best obtainable information on the subject. Should you one time in ten prepare for a cold wave or frost that does not come, the very small expense thus incurred will be offset a thousand fold by the benefit derived from the other nine warnings. These forecasts are not the vague guessing of any benighted soothsayer or astrologer, but are the result of intelligent and prolonged scientific research and experience in correlating the daily weather changes of this country. In order that you may appreciate the thorough system by which the forecasts are brought directly to your knowledge, I propose to briefly review the manner in which the Weather Bureau collects its reports and makes and distributes its forecasts and warnings.

Mr. Chaffee then outlined in plain language the work of the Bureau as to distribution and instrumental equipment of stations, the complete system of collecting telegraphic reports, how the reports are charted and the forecasts of storms, cold waves, etc., made, and the method of quickly placing the information before the public. He explained the great benefit the recent flood warnings of the Bureau were to the farmers along the Alabama and Coosa rivers, and dwelt upon some of the best means of protecting crops from frosts. All were advised when they returned home to inquire for the daily forecasts that should be received at their post-offices, and that they will be furnished if the postmaster applies for them. Attention was directed to the value of the weekly climate and crop bulletins, the value of the work of the voluntary observers, and the importance of Weather Bureau records in cases where suit is brought for damage done by the weather.

On February 6, Mr. Charles E. Linney, Section Director for Illinois, delivered an address at Geneva, Ill., before the Farmers' Institute of Kane County, on the Weather Bureau and its work with special reference to agricultural conditions. By means of three large weather maps he showed the progress of storms, the methods of forecasting and by special maps for Illinois showed the location and number of voluntary observers and forecast displaymen. After talking thirty minutes he invited questions from the audience and the queries occupied about twenty minutes more. Some of those in the audience came to talk personally with Mr. Linney after the address was over. Many of these were voluntary observers and solicited special instructions relative to their instruments and records. Mr. Linney was followed by Mr. James Riley, of Thornton, Ind., with an address on culture of corn. He prefaced his remarks with a splendid indorsement of the work of the Bureau, giving half a dozen instances in which he had made valuable saving of time, seed, and crops by the use of the Weather Bureau forecasts.

### A CHANGE AT KEW OBSERVATORY.

A circular, signed by R. T. Glazebrook, has been received by the Chief of the Weather Bureau announcing that the Kew Observatory, which has been famous in science for a hundred years, is to be hereafter known as the National Physical Laboratory, old Deer Park, Richmond, Surrey, England. At the request, and with the support of Her Majesty's Government, the National Physical Laboratory has been es-